PROC. BIOL. SOC. WASH.
104(2), 1991, pp. 322–327

A NEW GENUS AND SPECIES OF NEOTROPICAL WATER BEETLE, *JOLYELMIS AUYANA,* FROM A VENEZUELAN TEPUI (COLEOPTERA: ELMIDAE)

Paul J. Spangler and Robin A. Faitoute

Abstract.—A new genus and species of the aquatic beetle family Elmidae, *Jolyelmis auyana,* is described and illustrated with pen and ink drawings and scanning electron micrographs. The biotope on Auyan-tepui, Bolivar, Venezuela, is described.

The distinctive new genus of elmid beetle described below was sent to us by Luis J. Joly, one of the collectors. Joly and A. Chacon collected specimens of this taxon from a cascade on Auyan-tepui in Bolivar, Venezuela. Auyan-tepui is the largest plateau (700 km^2) of the group of plateaus found in the ancient area of the Guayana Highland Shield of northern South America. These ancient plateaus are known to be inhabited by many endemic plants and animals. We describe this new genus so others may be aware of it and help establish its range and, eventually, determine whether it is or is not endemic to Auyan-tepui.

Elminae

Jolyelmis, new genus

Diagnosis.—This new genus may be distinguished from all other known elmid genera of the Western Hemisphere by the following combination of characters. Pronotum and each elytron with 3 high, longitudinal carinae (Figs. 2, 8); metasternum with an arcuate, lateral carina on each side of disc (Fig. 10); an arcuate carina extending from medial margin of each metacoxal cavity to posterior margin of abdominal sternum 1 (Fig. 14).

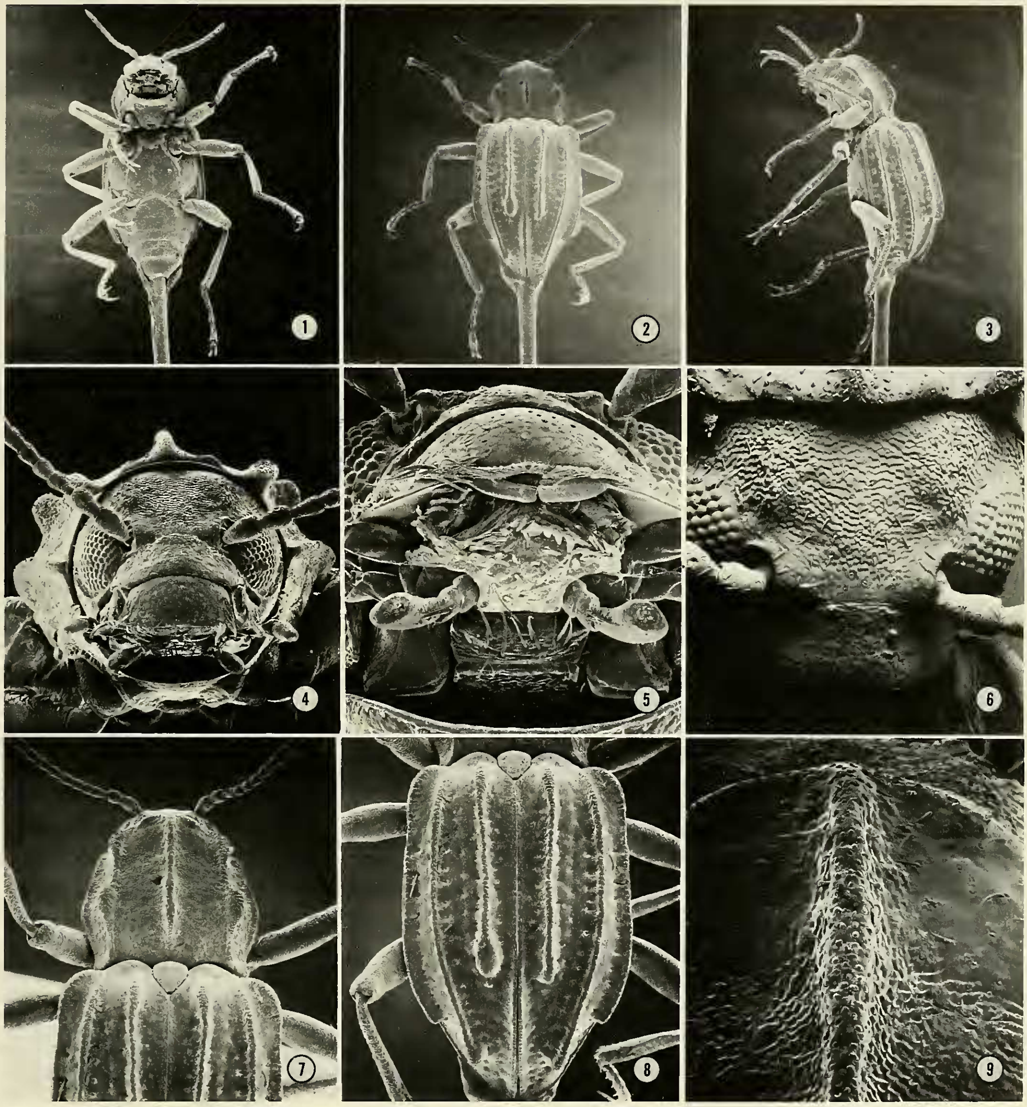
Description.—Body form subovate, convex dorsally (Figs. 1–3); pronotum about a third as long as elytron. Dorsal and ventral surfaces with very sparse, fine, golden setae. Tracts of thick golden plastron setae on gena, prosternum, hypomeron, epipleuron, proepisternum, mesepisternum, metepisternum, metasternum, abdominal segments 1–3, coxae and trochanters, profemora, mesofemora, and posterior (inner) surfaces of all femora. Cleaning fringe formula, 2-2-1.

Head retracted into pronotum. Antenna, 11 segmented. Labrum about twice as wide as long (Fig. 4); anterolateral margins moderately arcuately rounded. Clypeus transversely rectangular, about 3 times as wide as long (Fig. 4). Maxillary palpus, 4 segmented. Labial palpus, 3 segmented. Mentum transversely rectangular (Fig. 5). Submentum as wide as but a fifth as long as mentum (Fig. 5).

Pronotum subquadrate; widest at midlength (Fig. 7); sinuate/arcuate laterally; with 2 distinct, sublateral, bisinuate carinae; sublateral carinae extending entire length of pronotum, gibbose at three-fourths of its length, then narrower and lower at posterolateral corners; meson with an unevenly raised carina extending from anterior margin almost to base. Scutellum subtriangular (Fig. 15).

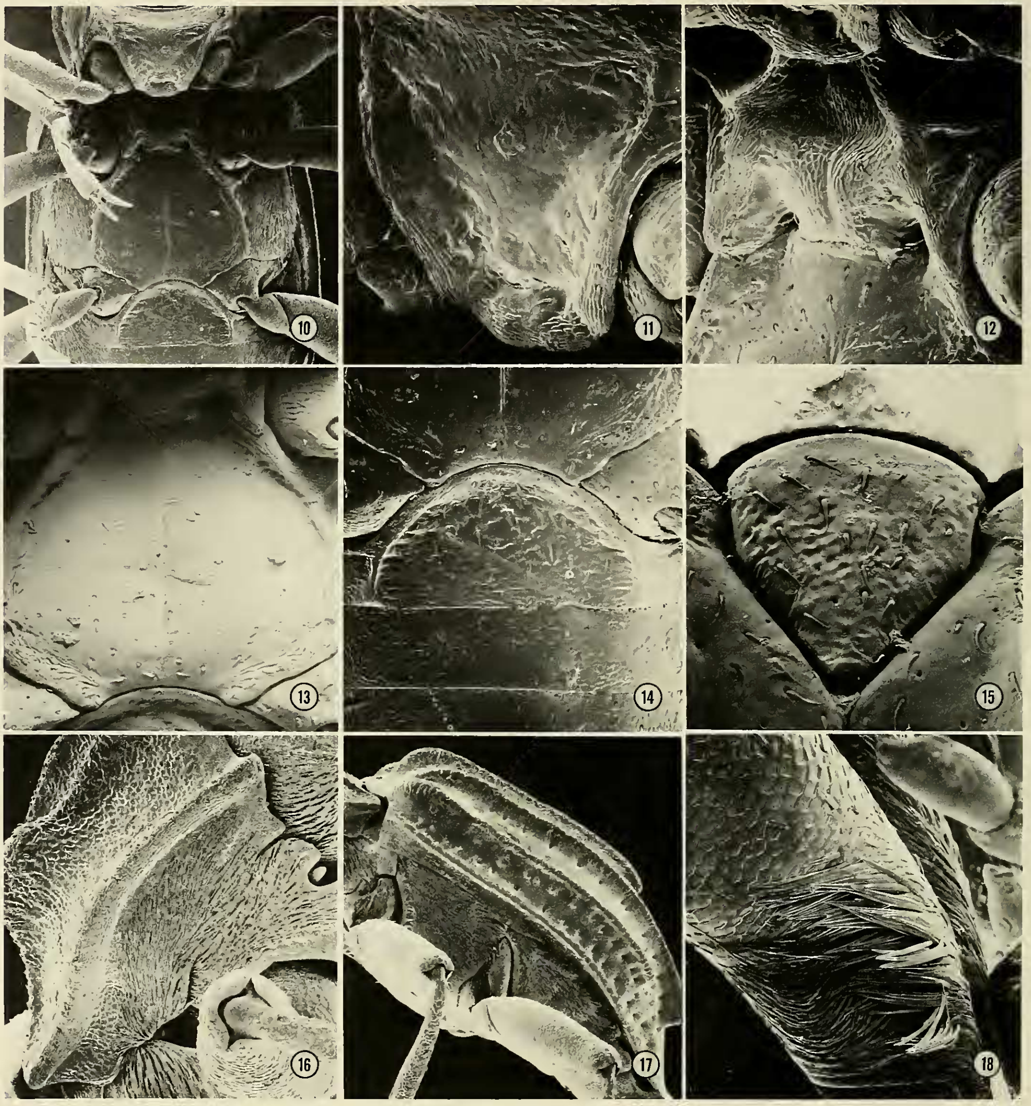
Elytron with 10 poorly defined, longitudinal rows of punctures and 3 high, evenly raised carinae of unequal length (Fig. 8). Innermost carina shortest, middle carina longest, lateral-most carina intermediate in length; all carinae terminate abruptly.

Prosternum broad, more than 4 times as



Figs. 1–9. *Jolyelmis auyana,* new genus, new species: 1, habitus, ventral view, ×35; 2, habitus, dorsal view, ×35; 3, habitus, lateral view, ×35; 4, head, adoral view, ×140; 5, labium and mouthparts, ×300; 6, vertex and clypeus, ×250; 7, head, pronotum and elytral bases, ×75; 8, elytra, ×75; 9, carina, pronotal meson, ×400.

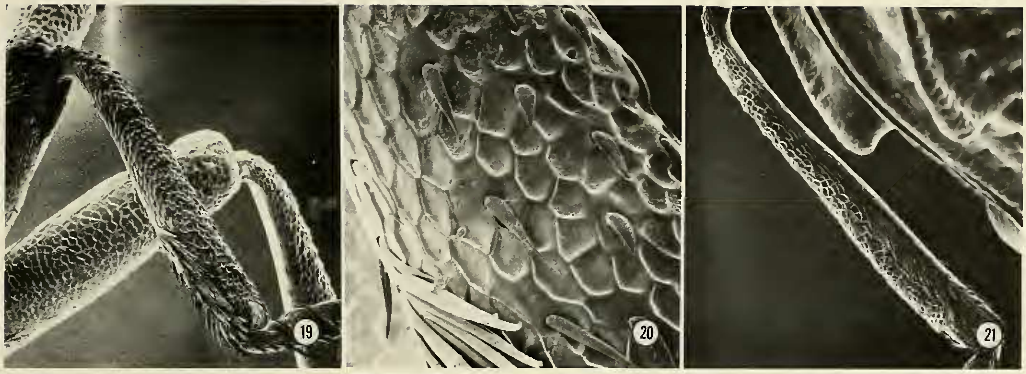
wide as width of procoxa; with transverse depression extending entire width just in front of procoxae (Fig. 10). Prosternal process broad, ending just behind procoxae (Fig. 10), slightly longer than prosternum in front of procoxae. Mesosternum with deep, broad, rimmed medial depression in front of and between anterior fourth of mesocoxae for reception of prosternal process; posterior margin with a deep fovea (Fig. 12) on each side of meson. Metasternum wider than long (Fig. 10); with 1 complete carina each side of disc, carinae extending from posteromedial edges of mesocoxae to middle of anterior edges of metacoxae; disc with narrow, shallow, longitudinal, mesal groove (Fig. 13); without plastron setae. Procoxae and mesocoxae rounded (Fig. 10). Metacoxae trans-



Figs. 10–18. *Jolyelmis auyana,* new genus, new species: 10, prosternum, mesosternum, metasternum, and abdominal sternum 1, ×100; 11, prosternal process, oblique view, ×400; 12, mesosternum, oblique view, ×350; 13, metasternal disc, ×220; 14, carina, abdominal sternum 1, ×220; 15, scutellum, ×550; 16, hypomeron, ×230; 17, epipleuron, ×100; 18, profemoral fringe, ×500.

verse (Fig. 10). Anterior and posterior surface of profemur (Fig. 18) and mesofemur with basal patch of long, dense, golden setae. Posterior surface of metafemur with basal patch of long, dense, golden setae. Protibiae (Fig. 19) and mesotibiae each with a cleaning fringe of golden setae on anterior and posterior surfaces. Metatibia with 1 apical cleaning fringe on posterior surface (Fig. 21). Tarsal claws robust, without teeth.

Abdomen with 5 visible, convex, evenly rounded sterna. Sterna not lobed laterally. Sternum 1 rimmed anteromedially; rim continuing laterally as arcuate carina; cari-



Figs. 19–21. *Jolyelmis auyana,* new genus, new species: 19, protibial cleaning fringe, ×220; 20, protibial sculpture, ×1300; 21, metatibial cleaning fringe, ×200.

nae extending from medial margin of metacoxal cavity almost to posterior margin of sternum 1 (Figs. 10, 14).

Type species.—*Jolyelmis auyana,* new species; gender feminine.

Etymology.—This genus is named for our friend Luis Jose Joly, one of the collectors of the type series.

Comparative notes.—This genus is a member of the subfamily Elminae and, unfortunately, there is no key to the 36 known neotropical elmid genera of the subfamily. For comparison, we have representatives of all of the described elmid genera of the Western Hemisphere and the distinctive exceptionally high carinae on the pronotum and elytra distinguish *Jolyelmis.*

Jolyelmis auyana, new species
Figs. 1–25

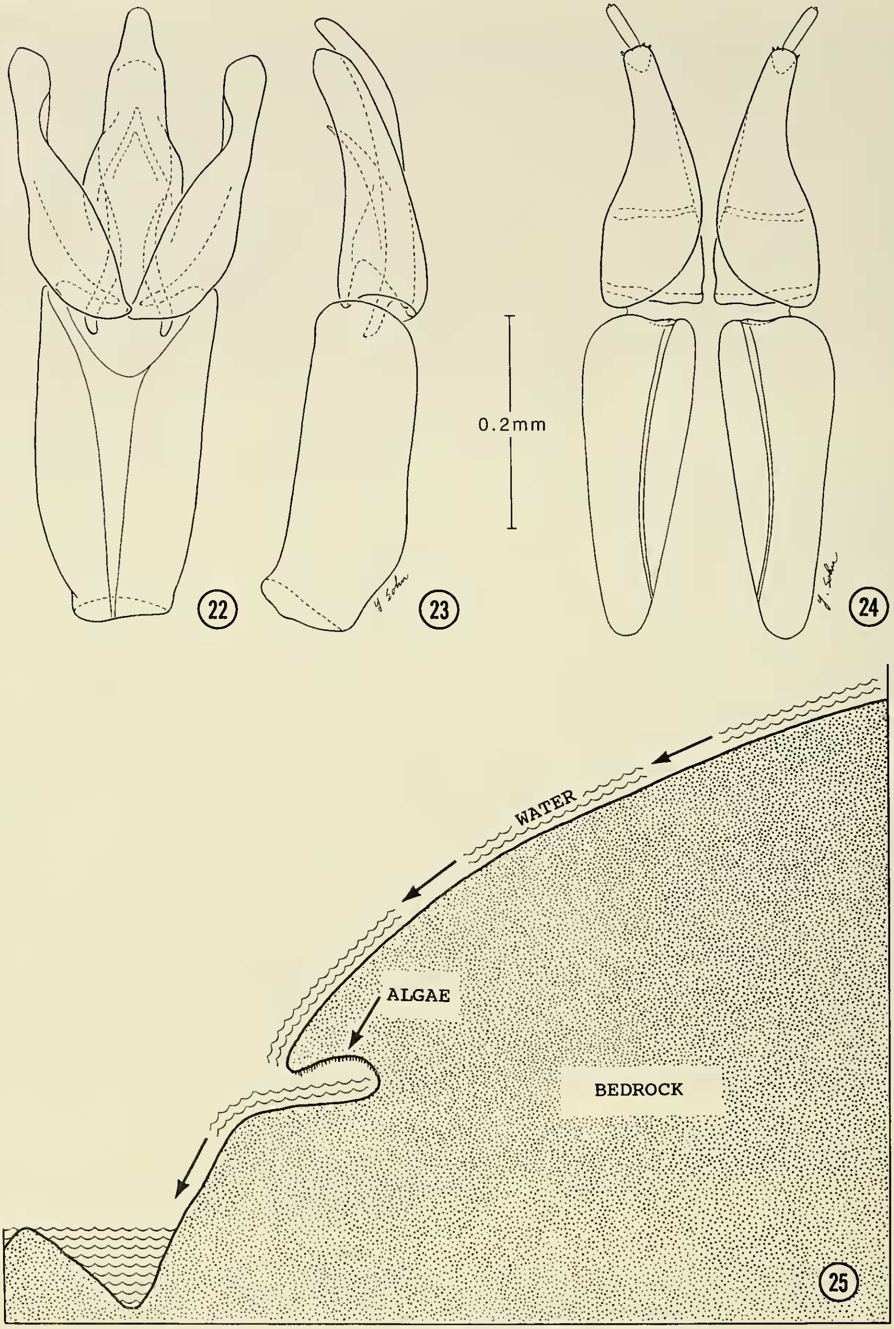
Holotype ♂.—Form and size: Oval. Length, 1.96 mm; width, at elytral midlength, 0.91 mm.

Color: Black except antennal segments 1 and 2 and maxillae reddish brown.

Plastron: Tracts of thick golden plastron setae on gena; sides of prosternum; hypomeron except small, anterior, slender carina (Fig. 16) and triangular wedge posteriorly; epipleuron posteriorly to abdominal segment 3 (Fig. 17); proepisternum; mesepisternum; metepisternum; lateral surfaces of metasternum and abdominal sterna 1–3 (Fig. 17); posterolateral surfaces of coxae and trochanters; basal third of anterior surface of profemora (Fig. 18); basal fourth of anterior surface of mesofemora; and basal third of posterior (inner) surfaces of all femora.

Head: Partially retracted into pronotum. Vertex with shallow, V-shaped depression behind antennal acetabula and between eyes (Fig. 6). Surface microreticulate; with sparse, fine setae. Antennal segments 1 and 2 slightly thicker than remainder; segment 3 as long as segment 2. Clypeus moderately arcuate apically (Fig. 4); nearly 3 times as wide as long. Clypeal and labral surfaces with fine, very sparse punctures and flattened setae. Labrum about twice as wide as long (Fig. 4); anterolateral margins moderately arcuately rounded. Maxillary palpus with last segment about 3 times longer than penultimate segment. Labial palpus with last segment flattened and about a fourth wider than penultimate segment (Fig. 5).

Thorax: Pronotum 0.62 mm long, 0.64 mm at widest point; posterior ⅘ microreticulate (Fig. 9); crests of carinae bearing sparse, short, flattened setae; median carina uniformly wide and extending from apex almost to base (Fig. 7); lateral carinae extending from apex to base, swollen apically and gibbose slightly behind midlength; an-



Figs. 22–25. *Jolyelmis auyana,* new genus, new species: 22, male genitalia, dorsal view; 23, male genitalia, lateral view; 24, female genitalia, ventral view; Fig. 25, schematic cross section of bedrock biotope of *Jolyelmis auyana.*

terolateral angles obtuse; posterior angles acute (Fig. 7). Scutellum subtriangular; with sparse flattened setae (Fig. 15). Elytron 1.34 mm long, 0.45 mm wide; with 3 high longitudinal carinae (Fig. 8); carinae of unequal length; innermost carina shortest, extending from base about $\frac{5}{9}$ of elytral length; middle carina longest, extending from base about $\frac{8}{9}$ of elytral length; sublateral carina extending about $\frac{7}{9}$ of elytral length from base at humeral angle; crests of carinae with short, flattened setae; posterior third of sutural margins subcarinate (Fig. 8); intervals with very few, fine, slender setae and moderately coarse punctures, punctures separated by 6 to 8 times puncture diameter. Prosternum in front of procoxae about as long as procoxa (Fig. 10); with a low carina extending from procoxal cavity to anterior margin of prosternum. Prosternal process broad, narrowly rimmed, converging gradually to arcuate apex (Fig. 11); with an apicomedial depression. Mesosternum with posterior margin bisinuate and deeply depressed on each side of meson (Fig. 12); with a few, fine setae. Metasternum with posteromedial $\frac{2}{3}$ broadly, moderately deeply depressed; metasternal disc with very sparse, short, flattened setae (Fig. 13). Procoxae, mesocoxae, and metacoxae with sparse, flattened setae. Legs, except tarsi, microreticulate (Fig. 20). Tarsus with last segment swollen and as long as combined length of segments 2–4; with several long setae on ventral surface; segment 5 with additional longer, fine setae.

Abdomen: Visible sternum 1 sparsely punctate between arcuate carinae; with few, fine setae (Fig. 14); lateral surfaces with dense, slender, golden setae (Fig. 10). Sterna 2–4 sparsely microreticulate, punctate; with few, fine setae. Sternum 5 densely microreticulate. Sterna 1–3 with lateral bands of fine, golden plastron setae (Fig. 17).

Genitalia: As illustrated (Figs. 22, 23).

Female.—Externally similar to male except the posteromedial depression of the metasternum is narrower and more shallow than that on male. Genitalia as illustrated (Fig. 24).

Variations.—Six specimens of each sex were measured for length and width. Males were smaller and ranged from 1.83 to 1.96 mm in length ($\bar{X} = 1.85$ mm) and 0.87 to 0.93 mm in width ($\bar{X} = 0.89$ mm). Females ranged from 1.79 to 2.0 mm ($\bar{X} = 1.93$ mm) in length and 0.87 to 0.94 mm in width ($\bar{X} = 0.91$ mm).

Type data.—Holotype ♂: Venezuela: Bolivar: Auyantepuy, 2100 m, 10–13 Feb 1988, L. Joly, A. Chacon; deposited in the collection of the Central University of Venezuela, Maracay, Venezuela. Allotype: Same data as holotype.

Paratypes: Same data as holotype: 2 ♂, 4 ♀, deposited in the collection of the Central University of Venezuela, Maracay, Venezuela; 3 ♂, 3 ♀, deposited in the National Museum of Natural History, Smithsonian Institution, Washington, D.C.

Etymology.—Named *auyana* for the tepui from which the specimens were collected.

Habitat.—According to Joly and Chacon, specimens of this elmid species were found in cracks on an algae-covered surface of an overhanging "lip" of a cavity in a cascade (Fig. 25).

Acknowledgments

We thank L. Joly and A. Chacon for collecting the specimens, sending them for study, and sending a sketch and description of the biotope. We also thank S. G. Braden, Scanning Electron Microscopist, for taking the micrographs and P. M. Spangler for typing the manuscript.

Department of Entomology, National Museum of Natural History, Smithsonian Institution, Washington, D.C. 20560.